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FOCUS

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On the cover: 2007 USAMO winners. Photo courtesy of Robert Allen Strawn

New Officers Elected

President-Elect:
David M. Bressoud
Macalester College

First Vice President:
Elizabeth Mayfield
Hood College

Second Vice President:
Daniel J. Teague
North Carolina School of Science and Mathematics

The election for MAA officers concluded on May 31, 2007. Conducted using both online voting and paper ballots, the election had a record response rate of 20.99%. A total of 5,078 votes were cast. Of the votes cast, more than 63% were submitted online. The new officers will begin their terms in January at the conclusion of the Joint Mathematics Meetings in 2008.

David Bressoud of Macalester College was chosen as President-Elect, a role he will play during 2008. He will then become the President of the Association for 2009–2010. The two vice presidents will serve a two-year term beginning in 2008.

The MAA is grateful to all candidates for office. They are dedicated members who have devoted their time and effort to the betterment of the association. They help to make the MAA what it is.

Bass and Efron Receive National Medal of Science

On July 27, the President of the United States awarded the National Medal of Science to a stellar group of recipients. At a ceremony at the White House, President Bush honored the 2005 and 2006 recipients of the Medal. More information on the event can be found at http://www.whitehouse.gov/news/releases/2007/07/20070727-9.html.

Among the 2006 medalists was Hyman Bass, professor of mathematics and mathematics education at the University of Michigan. Bass was cited "for his fundamental contributions to pure mathematics, especially in the creation of algebraic K-theory, his profound influence on mathematics education, and his service to the mathematics research and education communities. With his unique combination of gifts he has had enormous impact over the course of a half century."

Among the 2005 medalists was Bradley Efron, professor of statistics and of health research and policy at Stanford University. Efron was cited "for his contributions to theoretical and applied statistics, especially the bootstrap sampling technique; for his extraordinary geometric insight into nonlinear statistical problems; and for applications in medicine, physics and astronomy."

Established in 1959, the National Medal of Science and the National Medal of Technology are intended to honor individuals "for pioneering scientific research in a range of fields, including physical, biological, mathematical, social, behavioral and engineering sciences, that enhances our understanding of the world and leads to innovations and technologies that give the United States its global economic edge."

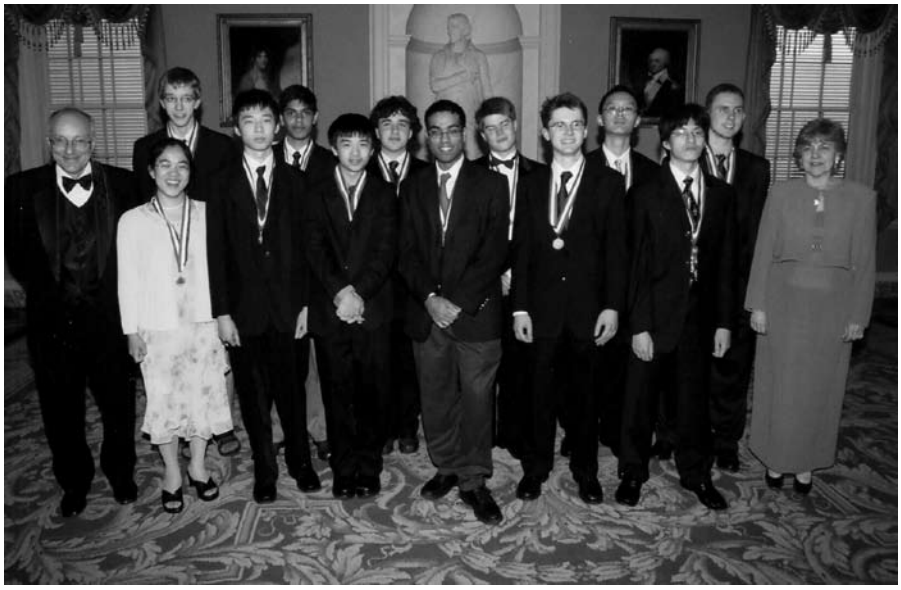
Mathematicians Elected to the National Academy of Sciences

On May 1, 2007, the National Academy of Sciences announced the election of 72 new members and 18 foreign associate members. This year's class included five mathematicians among the new members, plus two among the foreign associates. Elected to membership were Robert L. Bryant of Duke University (recently named Director of MSRI in Berkeley), Richard Durrett of Cornell, David Gottlieb of Brown, Curtis T. McMullen of Harvard, and Harold M. Stark of the University of California San Diego. Pierre Deligne of the Institute for Advanced Study and John Kingman of the University of Cambridge were elected as foreign associates. Bryant and Stark are members of the MAA.

Mathematical Olympiad Winners Honored at the U.S. Department of State

By Lisa Kolbe

The 36th USA Mathematical Olympiad Awards Ceremonies took place in Washington, DC on Sunday and Monday, May 20 and 21, 2007. This event honors the twelve winners of the annual USA Mathematical Olympiad exam, the premier high-school level mathematical problem solving competition in the United States. The two-day celebration began with a sponsors' reception at the MAA headquarters in its newly renovated Carriage House Conference Center. Representatives of the sponsoring organizations of the American Mathematics Competitions, along with members of the MAA Executive Committee, were there to meet and greet the winners and their families. On Monday morning, the winners toured the Cryptologic Museum at the National Security Agency and enjoyed a talk from one of the on-site mathematicians on classical cryptography.



Winners of the USAMO. Front row from left to right: President Joe Gallian, Sherry Gong, Delong Meng, Alex Zhai, Arnav Tripathy, Tedrick Leung, and Executive Director Tina Straley. Back row from left to right: Adam Hesterberg, Krishanu Sankar, Brian Lawrence, Sergei Bernstein, Eric Larson, Haitao Mao, and Jacob Steinhardt.

The 2007 USAMO winners are:

Sergei Bernstein, Belmont, MA

Sherry Gong, San Juan, Puerto Rico

Adam Hesterberg, Seattle, WA

Eric Larson, Eugene, OR

Brian Lawrence, Kensington, MD

Tedrick Leung, Winnetka, CA

Haitao Mao, Vienna, VA

Delong Meng, Baton Rouge, LA

Krishanu Sankar, Hastings on Hudson, NY

Jacob Steinhardt, Vienna, VA

Arnav Tripathy, Chapel Hill, NC

Alex Zhai, Champaign, Il

John Marburger III, Director of the Office of Science and Technology Policy in the Executive Office of the President, was the host at the celebratory reception and dinner in the Diplomatic Reception Rooms of the U.S. Department of State.

The formal awards ceremony, presided over by MAA President Joseph Gallian, took place in the Dean Acheson Auditorium of the State Department where George Csicsery, writer and independent film maker, treated the audience to a viewing of *Hard Problems*, a film about the 2006 IMO team.

Winners received the USAMO Medal, named in honor of Gerhard C. Arenstorff, twice a winner of the USAMO and a member of the first USA team in the International Mathematical Olympiad.

After dinner, Brian Lawrence received the Samuel L. Greitzer/Murray S. Klamkin Award for his superior achievement in the Olympiad exam. Dr. James Carlson, President of the Clay Mathematics Institute, designated Andrew Geng as the ninth CMI Mathematics Olympiad Scholar, noting that Geng best fulfilled the prize's criteria of "elegance, beauty, imagination, and depth of insight" even though Geng was not among the top twelve. Andrew attends Westford Academy in Westford, Massachusetts.

The Robert P. Balles Distinguished Mathematics Student Award, given to each of the twelve winners, is given in an effort to recognize and reward their high achievement in the world of mathematics competitions. Robert P. Balles is a lifelong student of mathematics, former community college instructor of mathematics, and retired businessman who established this generous prize in 2005.

The highlight of the evening came when the Akamai Foundation Scholarships were presented to the 1st place winner, Brian Lawrence, and to Sherry Gong and Alex Zhai, who tied for 2nd place. Jonathan Seelig, one of the founders of Akamai Technologies and the Akamai Foundation, presented the awards. These scholarships are in the amounts of $20,000 and $15,000 respectively. With these scholarships, the Akamai Foundation hopes to encourage these and other

students to continue their pursuit of mathematics education.

The road to the USAMO begins with the American Mathematics Contest 10 (AMC 10) and American Mathematics Contest 12 (AMC 12) exams. In February, about 240,000 students from over 4,000 schools participated in these contests. The AMC 10 and AMC 12 have 25 questions from the high school mathematics curriculum to be answered in a timed 75-minute format. The problems range from easy to quite challenging. The top 5% of scorers on the AMC 12 and the top 1% of scorers on the AMC 10 are invited to take the American Invitational Mathematics Exam (AIME). The AIME is a challenging 15-question contest spanning three hours. The difficulty of the questions ranges from equivalent to the most difficult on the AMC 12 to extremely difficult. In March, nearly 12,000 students took the AIME.

Based on a combination of scores from these two contests, 506 students were invited to take the USA Mathematical Olympiad (USAMO) exam which was held on April 24 and 25. The USAMO is a six question proof-essay contest, taking nine hours over two days. The problems on the USAMO would be challenging even to professional mathematicians. This year's USAMO problems and solutions are available on the web at the MAA web site: choose the "Students" tab on the MAA home page and follow the links.

The twelve winners and other students who took the Olympiad exam are invited to the Mathematical Olympiad Summer Program (MOSP) for advanced training for the International Mathematical Olympiad (IMO). The 2007 Mathematical Olympiad Summer Program was held on the campus of the University of Nebraska-Lincoln from June 10 to June 30 with 55 students and 15 instructors and graders in attendance. The students received a mix of training on mathematical problem solving, proof-writing and deeper instruction on algebra, geometry, number theory, combinatorics, probability, and trigonometry in preparation for solving Olympiad-style problems. This summer program was funded in part with a grant from the Akamai Foundation.

The final US team for the IMO is selected from among the 12 winners at the MOSP. Each year since 1974, a small team of exceptionally talented high school students has represented the United States at the IMO. The IMO is a rigorous two day competition, again including problems that would challenge most professional mathematicians. In addition to comprehensive mathematical knowledge, success on the IMO requires truly exceptional mathematical creativity and inventiveness. The 2007 IMO, held in Hanoi, Vietnam, between the 19th and 31st of July, was the 48th since Romania initiated the annual competition in 1959. United States teams have placed within the top countries in all IMOs in which they have participated. In ten of these, the United States was awarded first or second place.

Filming *Hard Problems*

By Harry Waldman

On the evening of May 21st, attendees at the awards ceremony honoring this year's U.S.A. Mathematical Olympiad (USAMO) winners got a special treat. Filmmaker George Paul Csicsery screened about 45 minutes of clips from his planned documentary about U.S. participation in the 2006 International Mathematical Olympiad.

Csicsery has titled his film *Hard Problems*. He hopes that, in the end, it will provide an engaging and illuminating glimpse of teenage mathematicians competing to solve math problems at the highest possible level. It follows up the book *Count Down: Six Kids Vie for Glory at the World's Toughest Math Competition*, by Steve Olsen, which documented U.S. participation in the 2001 International Mathematical Olympiad.

Csicsery, perhaps best known among mathematicians as the director of the documentary *N Is a Number: A Portrait of Paul Erdös* (1993), had the freedom to film the various steps in last year's Olympiad process. His documentary follows select students struggling through the two-day USAMO tests at the Harker School, in Saratoga, CA., and elsewhere last April; the USAMO awards ceremony in Washington, D.C., in May; and the subsequent team selection test to decide the six members of the U.S. IMO team. Csicsery and his crew followed the team to Ljubljana, Slovenia, where 498 young mathematicians from 90 countries competed in the 2006 IMO.

The filmmakers photographed the students taking part in the colorful opening ceremony, preparing for and enduring the pressure-filled exams, going on excursions, and relaxing after the contest. Several scenes provided insights into the complicated process of judging and scoring the papers. A dramatic closing ceremony unveiled the winners.

Csicsery hopes to have his 90-minute documentary — which is produced by the MAA — ready early next year. Having already shot nearly 90 hours worth of film, Csicsery said that he needs only another 10 or 15 hours of footage before he begins the laborious process of editing the material into a dramatic story that he hopes will attract audiences unfamiliar with the trials, tribulations, incredibly hard work, and triumphs of the young, multi-talented U.S. math wizards.

U.S. Team Places Fifth in IMO

The U.S. team ended up in fifth place at the 48th International Mathematical Olympiad, held in Hanoi, Vietnam, on July 19–31, 2007. Russia's team won top honors, scoring 184 out of a possible 252 points. Five of the six members of the Russian team won gold medals.

The U.S. scored 155 points, with two team members (Alex Zhai and Sherry Gong) winning gold medals, three (Brian Lawrence, Eric Larson, Arnav Tripathy) winning silver, and one (Tedrick Leung) winning bronze.

Following Russia in first place were China (181 points), South Korea (168), and Vietnam (168). The official team scores can be seen online at http://www.imo2007.edu.vn/index.php?module=ViewResultByCountry.php. Brazil came in 24th, Argentina in 47th. Canada ended up in 27th, just beating the United Kingdom, in 26th.

Individual results are also online, at http://www.imo2007.edu.vn/index.php?module=ViewRank. They show that Alex Zhai ended up in 7th place and Sherry Gong in 8th, both with an overall individual score of 32 points. The top individual was Konstantin Matveev of Russia, who scored 35 points. For more information, see the IMO2007 web site at http://www.imo2007.edu.vn/.

"Congratulations to the team for a fine performance on what the leaders agree was a very hard IMO," said Steve Dunbar, MAA Director of Competitions. He also thanked team leader Zuming Feng and coach Ian Le. "It's incredibly hard work," Dunbar added, "and they did it well."

The IMO 2007 closing ceremony took place on July 30, 2007. The 2008 International Mathematical Olympiad will be contested in Madrid, Spain. The official web site for the IMO is at http://www.imo-official.org/.

Photographs provided through the IMO 2007 web site.

Opening ceremonies at the IMO.

Students get ready to take the test.

The United States Team at the 48th IMO

Sherry Gong, Phillips Exeter Academy, Exeter, NH

Eric Larson, South Eugene High School, Eugene, OR

Brian Lawrence, Montgomery Blair High School, Silver Spring, MD

Tedrick Leung, North Hollywood High School, Winnetka, CA

Arnav Tripathy, East Chapel High School, Chapel Hill, NC

Alex Zhai. University Laboratory High School, Champaign, IL

Robert Vallin Joins MAA as Associate Director for Student Programs

Robert W. Vallin of Slippery Rock University has joined MAA headquarters to become the first-ever Associate Director of Student Programs. The Associate Director, working with Michael Pearson, Director of Programs and Services, will be involved in all aspects of student membership. This includes working on recruitment and retention of MAA student members, assisting on events at meetings, and managing grants applications and distributions.

Vallin received his bachelor's degree from the University of Maryland, College Park, and earned his M.S. and Ph.D. from North Carolina State University. He has been at SRU since 1992, rising to the rank of full professor. The author of several papers on real analysis and topology, he is also proud of his non-research writings, including two articles in *Math Horizons*. Vallin was very active in the Allegheny Mountain Section of the MAA, including five years as Puzzle Czar and six years as Coordinator of Student Programs. He is on a two-year leave of absence from Slippery Rock.

One of his first goals is to turn the MAA web site into the "go-to source" for high school, undergraduate, and graduate students interested in mathematics and mathematical careers. In addition to articles on math itself, the future web site will help students find summer programs, and obtain job information including how to write curriculum vitaes, résumés, and cover letters. As Vallin points out though, this is a position whose responsibilities are in flux. Any and all ideas, desires, and suggestions are welcomed. He can be reached via email at rvallin@maa.org.

Math Circle Summer Teacher Training Institute

By Bob & Ellen Kaplan

Since 1994 the Math Circle at Harvard and Northeastern Universities has made math a source of intense delight for students from 4 to 60 years old. This January, our book *Out of the Labyrinth: Setting Mathematics Free* was published. The book's description of the Math Circle has generated a great number of requests, from across the country and around the world, for help in creating new branches. We're ready to set these up and are looking for people eager to run them, who know enough math, understand kids, and share our collegial rather than competitive approach. For details about our approach, see *Out of the Labyrinth,* and *The Art of the Infinite,* each of whose chapters were Math Circle classes. See also our web site, at http://www.themathcircle.org.

We will therefore hold a training program from July 6th to 12th, 2008, on the campus of the University of Notre Dame, in South Bend, Indiana. The 20 or so candidates will observe and teach small groups of students ranging in age from 4 to 18, discuss math, the teaching of it, and details of running a Math Circle. Each candidate is expected to start a Math Circle after having attended.

The instructors will include Bob and Ellen Kaplan, Amanda Serenevy (Executive Director, Riverbend Community Math Center, Mishawaka, Indiana), and Sam Lichtenstein (Harvard University). The Institute is sponsored by the Mathematical Sciences Research Institute, the Flom Foundation, the Herbert O. Wolfe Foundation, and the Northern Indiana Science, Mathematics, and Engineering Consortium. Tuition is $750 for the week, room and board included. If you would like to apply, please e-mail us at kaplan@math.harvard.edu.

Archives of American Mathematics Spotlight: The Isaac Jacob Schoenberg Papers

By Carol Mead

The Archives of American Mathematics (AAM) has recently made available the papers of Isaac "Iso" Schoenberg (1903-1990), known for his work in approximation theory and splines. Sean Heyliger, the AAM's archival assistant, rehoused the papers and photographs into archival-quality folders and boxes and created a more detailed inventory of the papers, which will assist our researchers in accessing the collection. The papers consist of correspondence, class notes from his student days, research and teaching notes, and personal documents. Schoenberg's wife, Dolly, and a colleague donated the papers to the University of Texas at Austin in 1991.

Correspondence is one highlight of the Schoenberg collection. As the series reveals, Schoenberg corresponded with some of the foremost mathematicians of the twentieth century: Harald Bohr, Issai Schur, Alexander Ostrowski, Edmund Landau (his father-in-law), Paul Erdös, George Pólya, John R. Kline, and Emil Grosswald. There are also letters between Schoenberg and his family, including his mother, sister and brother-in-law, Stefan Wolpe, and the composer, Joseph Marx. Many of the letters, as well as his notes and other documents, are written in languages other than English: Romanian, German, French, Italian, Dutch, and Russian.

Another highlight is Schoenberg's extensive research and teaching notes. These documents range over his lifetime, from his student days to his later life, and are, of course, handwritten, revealing in some notebooks a meticulous mind. This series, in fact, constitutes the largest part of the collection and will certainly be of interest to researchers.

Schoenberg was born in Galatz, Romania. His father, Jacob Schoenberg, was an accountant and his mother, Rachel Segal, a poet. His parents' devotion to Zionism provided an important influence for Schoenberg throughout his life. His mother spoke frequently at public meetings and, in the 1920s, acted as a delegate in several Zionist World Congresses in Israel. His father helped establish agricultural stations in Palestine for young Jewish boys and girls. Throughout his own life, Schoenberg was active in Jewish causes, including helping family and friends escape from Europe during the Holocaust.

The family moved to Jassy, Romania, in 1910. In 1922, Schoenberg received his M. A. at the University of Jassy. From 1922 to 1925, he continued his studies in Germany, where he spent three semesters at Göttingen and three in Berlin. While in Germany, he studied under Landau, Schur, and Ostrowski. In 1926, Jassy awarded him a Ph.D. Two years later, in 1928, Landau arranged a visit to the Hebrew University of Jerusalem (which Landau helped to establish), from which he returned in 1930. That same year, he married his first wife, Charlotte (Dolli) Landau, Edmund's daughter (he remarried in 1950, after Charlotte's death in 1949).

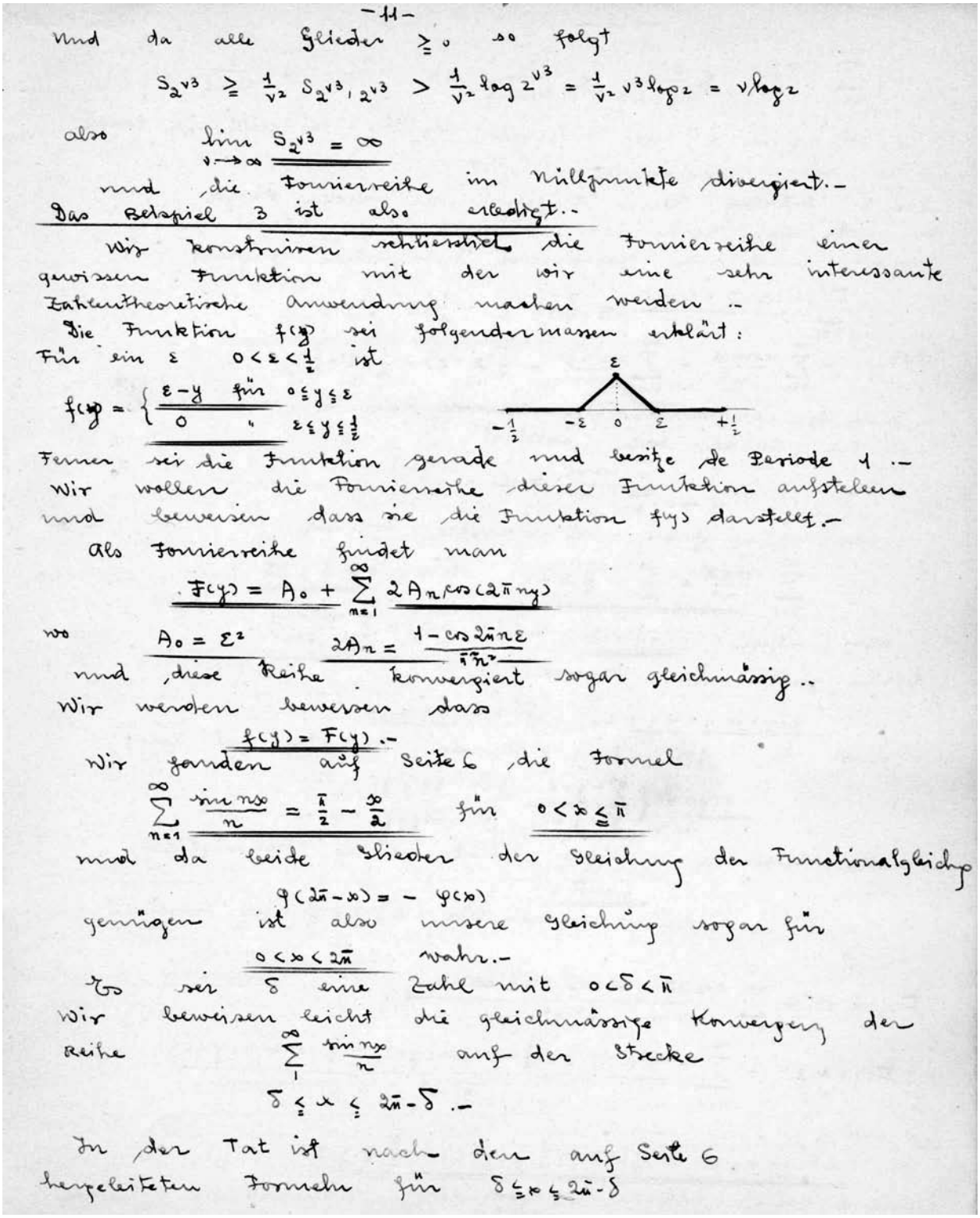
When Schoenberg was awarded a Rockefeller fellowship in 1930, he embarked on a new life in the United States. He moved around the country, studying first at the University of Chicago, then Harvard, and, from 1933 to1935, Princeton, where he worked on distance geometry and became a Fellow of the Institute for Advanced Study. After Princeton, he taught at Swarthmore, Colby, and the University of Pennsylvania, where he stayed from 1941 to 1965, with interruptions for sabbaticals and other projects.

Between 1943 and 1946, Schoenberg joined other mathematicians in the war effort in Aberdeen, Maryland; there, he was to refine computations of projectile trajectories on the ENIAC, which he did with what he called "Cardinal Spline Interpolation and Cardinal Spline Smoothing." He finally settled at the University of Wisconsin in Madison, where he taught until his retirement in 1973.

After he retired, Schoenberg remained active in mathematics and pursued other interests. Among other things, he taught as a guest lecturer at various institutions, wrote many papers, continued to referee as he had throughout his career for the *Journal of Approximation Theory*, and, in the 1980s, entered the Madison city sculpture contest with a submission he created using a mathematical model, the drawings for which are in the collection.

The finding aid for the Schoenberg collection is at http://www.lib.utexas.edu/taro/utcah/00211/cah-00211.html

The Archives of American Mathematics is located in the Research and Collections division of the Center for American History on the University of Texas at Austin campus. Persons interested in conducting research or donating materials or who have general questions about the Archives of American Mathematics should contact Carol Mead, Archivist: carolmead@austin.utexas.edu or (512) 495-4539. The Archives web page can be found at http://www.cah.utexas.edu/collections/math.php.



— 11 —

und da alle Glieder ≥ 0 so folgt

$$S_{2^{\nu^3}} \geq \frac{1}{\nu^2} S_{2^{\nu^3}, 2^{\nu^3}} > \frac{1}{\nu^2} \log 2^{\nu^3} = \frac{1}{\nu^2} \nu^3 \log 2 = \nu \log 2$$

also $\lim_{\nu \to \infty} S_{2^{\nu^3}} = \infty$

und die Fourierreihe im Nullpunkte divergiert.–

Das Beispiel 3 ist also erledigt.–

Wir konstruieren schliesslich die Fourierreihe einer gewissen Funktion mit der wir eine sehr interessante Zahlentheoretische Anwendung machen werden.–

Die Funktion $f(y)$ sei folgendermassen erklärt:

Für ein ε $0 < \varepsilon < \frac{1}{2}$ ist

$$f(y) = \begin{cases} \varepsilon - y & \text{für } 0 \leq y \leq \varepsilon \\ 0 & \text{“ } \varepsilon \leq y \leq \frac{1}{2} \end{cases}$$

Ferner sei die Funktion gerade und besitze die Periode 1.–

Wir wollen die Fourierreihe dieser Funktion aufstellen und beweisen dass sie die Funktion $f(y)$ darstellt.–

Als Fourierreihe findet man

$$F(y) = A_0 + \sum_{n=1}^{\infty} 2A_n \cos(2\pi n y)$$

wo $A_0 = \varepsilon^2$ $\quad 2A_n = \frac{1 - \cos 2\pi n \varepsilon}{\pi^2 n^2}$

und diese Reihe konvergiert sogar gleichmässig.–

Wir werden beweisen dass

$f(y) = F(y)$.–

Wir fanden auf Seite 6 die Formel

$$\sum_{n=1}^{\infty} \frac{\sin nx}{n} = \frac{\pi}{2} - \frac{x}{2} \quad \text{für} \quad 0 < x \leq \pi$$

und da beide Glieder der Gleichung der Funktionalgleichung

$$\varphi(2\pi - x) = -\varphi(x)$$

genügen ist also unsere Gleichung sogar für

$0 < x < 2\pi$ wahr.–

Es sei δ eine Zahl mit $0 < \delta < \pi$

Wir beweisen leicht die gleichmässige Konvergenz der Reihe $\sum_{1}^{\infty} \frac{\sin nx}{n}$ auf der Strecke

$$\delta \leq x \leq 2\pi - \delta .–$$

In der Tat ist nach dem auf Seite 6 hergeleiteten Formeln für $\delta \leq x \leq 2\pi - \delta$

Page from Schoenberg's notebook containing notes from a course taught by Edmund Landau.

FOCUS on Students: Writing a Résumé

By Robert W. Vallin

A résumé is a listing of your education, skills, activities and achievements. It should be a concise history (two pages, maximum) which shows why you are qualified for a particular job. Note that a curriculum vitae (CV) is not the same as a résumé. A CV is typically used when applying for an academic or research position. Just to show one difference, a CV starts at two pages and can go on for much longer. (We will discuss how to write a CV in a future article.)

A strong résumé is important. A weak résumé will get your application thrown in the garbage bin and you will never be considered for the job.

Writing about yourself can be difficult for someone about to graduate from college. Yes, you did spend the past three years working at the library, but you fail to see how this will get you that actuarial job. To make matters worse, you just got a sample résumé from the Job Placement Center on campus and the woman in this sample was the perfect student, ran most clubs on campus, volunteered for charity work, and will probably be running a multi-billion dollar company in two years while you're working your way up to the mailroom.

Okay, now take a deep breath and relax. You can just write a functional résumé rather than an experiential résumé. That is, talk about what you know rather than what you've done. So forget about her and let's concentrate on your résumé.

The basic ingredients for a résumé are (not necessarily in order) contact information, objective, skills and experiences, and education. Contact information should include your name, regular mail and email addresses, and phone numbers. Include your personal web page URL only if the site shows off your skills related to the job. "Objective" specifies what job you are looking for. The rest is about why you should get the job. The goal is to produce a focused account alerting employers to who and what you are.

The objective should be one sentence. Make sure that it is worded clearly and is not about what you want. Instead you should be showing prospective employers what you will do for them. This is where you make your first pitch, showing them that you are who they need to hire. The objective "To obtain a job where I can teach math to middle school students" pales in comparison to "Teaching mathematics at a middle school where creativity and the ability to motivate students is needed."

If you have been interning and working in the industry, then you have the experience and should put your jobs out in front and emphasize them. That makes an experiential résumé. If, on the other hand, you don't have much relevant work experience, then you should emphasize what you've learned to do even if you haven't had a chance to take your skills out for a spin. That is a functional résumé. So tell your future employer that you took two classes in Operations Research and you can solve problems in Linear and Dynamic Programming, Queuing Theory, Game Theory and Transportation Problems, and that you are well-versed in using different software packages to find the answer to various modeling applications. This type of résumé will represent you just fine.

Writing about your education is straightforward. List your degrees in reverse chronological order (most recent first). You should include the degree, name of the institution, location of the school, major, minor, and dates attended. Only if higher than a 3.0 should you bother to include your grade point average. When you are coming right out of college, education is usually the first item on your résumé after your objective. However, as time goes on and you gain more experience, education tends to work its way down the page.

Little details can have a big (often negative) impact. Use normal margins. Making them narrow so your information will fit on one page won't fool anyone. Nor will making them wide so the typing fills more of the page. Choose an easy-to-read font rather than a fancy one. Make sure the paper is professional. Putting your résumé on pink paper will certainly stand out: it will be the prettiest thing in the trash can.

Distinctive things (you speak a foreign language, made the Dean's list, or participated in the Mathematical Contest in Modeling) should find an appropriate place if they relate directly to the job or are a special skill or honor. The fact that you are a marathon runner should be included if you are applying to be a personal trainer. It is not important if the job is research assistant. One exception to that rule: Many employers are interested community service. If you are involved in charity work, list it.

Reading that your email address is cutiepuppypie@hotmail.com will not have a positive impact. Open up an email account just for your job search.

Don't bother listing references. They take up space, and you don't have much. If an employer wants references, you will be asked to provide them. Two more things about references: Make sure you ask ahead of time. No one likes a surprise phone call telling them they have been listed as a source. Also, make sure this person will be a good reference. Just because you loved Dr. X's class does not mean he remembers you or that he has a favorable impression of you. Just one statement like, "When he showed up he was very attentive," or worse, "Who?" and you are sunk. Once your reference agrees to help you, a simple note or email reminding him or her of what classes you took and how you did will help jog the memory.

Spell-checkers are very nice. Most will even correct simple things as you type. However, they will not know that you didn't really mean "tow" but you wanted "two." In addition, your computer will not indicate that you are being altogether too complicated and should eschew

obfuscation. You should be concise. You do not want long sentences or extra or complicated words clogging up the paper. The solution: Use other people. At least two people, if not more, should be reading anything you send out, checking for typos, misplaced punctuation, and any of the myriad mistakes we all make.

Do not forget to write down any professional organizations to which you belong. These show a commitment to your career. If you're new to all of them, just list the names. If you have been a member for a long time, show your commitment by putting in the years. Groups you may be interested in joining include the Mathematical Association of America (MAA), the American Mathematical Society (AMS), the Society for Industrial and Applied Mathematics (SIAM), the Association for Women in Mathematics (AWM), and the National Council of Teachers of Mathematics (NCTM).

Finally, résumés are not a "one size fits all" object. Since you are selling a product (yourself), you need to tailor each résumé to the prospective buyer (employer). Tailoring is easier than ever, since most workplaces have a web site you can browse. If you determine the specific responsibilities of the business or department you are applying to, you can make sure your résumé sells you as the person for that job.

There are lots of resources out there, both online and in print. Help writing your résumé can be found at:

Purdue University's online writing lab résumé workshop
http://owl.english.purdue.edu/workshops/hypertext/ResumeW/.

Monster.com page of samples
http://content.monster.com/samples/home.aspx.

This is the first in a series of short articles for students. The overall title for the series will be **FOCUS on Students**. Some of these articles will be for undergraduates, others for graduate students, and many for all students. These articles will also be posted in the Student section of the MAA web site.

Distinctive Documents' portfolio of sample résumés
http://www.distinctiveweb.com/samples.htm.

Use them so you can put together the package that best fits you and gets you that job. Good Luck!

Robert W. Vallin is the MAA Associate Director for Student Programs. He welcomes questions and comments by email at rvallin@maa.org.

Attend ICME-11 in Monterrey, Mexico

The Eleventh International Congress on Mathematical Education (ICME-11) will be held in Monterrey, Mexico, on July 6–13, 2008 (see http://www.icme-11.dk/). Contingent on the funding of a proposal now pending at the National Science Foundation, travel grants will be available and awarded by the close of 2007. These grants will be available only to U.S. citizens and will support travel expenses to ICME-11 that include hotel accommodations, meal costs, and conference registration. They also can be used toward air transportation (on American carriers only). Travel grant awardees under this program may not use funds from other NSF programs to supplement their international travel (airfare to Mexico or subsistence at ICME-11).

The International Congresses are held every four years and offer a unique opportunity for mathematics educators from the United States to discuss issues related to mathematics education with international leaders from developed and developing countries. Grants will enable participants to listen to world-renowned scholars in mathematics and mathematics education, and to take part in small, focused discussion groups on a wide range of topics. These topics include a special emphasis on educating students from diverse cultures, mathematics education for second language learners, the relationship between research and practice in mathematics education, the professional development of mathematics teachers; closing the achievement gap, and information and communication technology in mathematics education.

A selection committee will review applications and award the grants for ICME-11 travel. The committee will include representatives from the National Council of Teachers of Mathematics, the Mathematical Association of America, the American Mathematical Association of Two-Year Colleges, the American Mathematical Society, and the U. S. National Commission on Mathematics Instruction.

Elementary, middle, and high school teachers and graduate students are strongly encouraged to apply. Questions can be directed to Gail Burrill, burrill@msu.edu. The travel grant application and selection criteria are available on the NCTM Web site at http://www.nctm.org/icme.aspx or from Margaret Iding, 116 North Kedzie, Division of Science and Mathematics Education, Michigan State University, East Lansing, MI 48824; telephone (517) 355-1708, ext. 105; fax (517) 432-9868, e-mail idingm@msu.edu. The application deadline is September 30, 2007. Notifications will be made by December 30, 2007.

An Interview with Trachette Jackson

By Joe Gallian

Trachette Jackson is associate professor of mathematics at the University of Michigan. She received a Ph.D. in Applied Mathematics in 1998 from the University of Washington. Her research focuses on modeling the growth and control of cancer.

Jackson has held post-doctoral positions at Duke University, the Institute of Mathematics and its Applications at the University of Minnesota, and the National Health and Environmental Effects Research Laboratory of the Environmental Protection Agency. She is the recipient of an Alfred P. Sloan Research Fellowship and the Career Enhancement Fellowship from the Woodrow Wilson National Foundation. At the University of Michigan she received the Amoco Faculty Undergraduate Teaching Award. She is currently a co-PI on an NSF grant for a revolutionary program that will allow undergraduate students to develop knowledge and acquire skills in research areas that are at the interface of biology and mathematics. Jackson is a frequent invited lecturer at conferences and universities.

Joe Gallian: Did you start out as a math major in undergraduate school at Arizona State?

Trachette Jackson: No, I didn't. I entered Arizona State as an engineering major. I planned to go into aerospace engineering with hopes of maybe becoming an astronaut or something grand like that. But I had the good fortune to attend several math classes at Arizona State as a high school student, and I caught the interest of several math professors. They asked me what I was going to major in, and I told them engineering. They asked why, and I said because I'm good at math. I thought that that was the natural answer. They said "Why don't you major in math?" So I ended up changing my major in that first semester.

JG: Did you participate in research as an undergraduate?

TJ: I was fortunate enough to participate in an REU with a mathematical biologist while at Arizona State. That was my first experience in mathematical biology. I got to do a little bit of differential equations and see how they played a role in predicting growth of bacterial colonies. It was really great.

JG: Now mathematical biology is about the hottest field in mathematics. When you got started was it considered a hot field?

TJ: I think that it was just coming to the fore. I hadn't heard of mathematical biology and I had no idea that the two subjects could connect. I think that the faculty member whom I worked with was one of the only people doing it at Arizona State. I think that I was lucky to catch the wave at the starting point. I could have easily gone down a different path, so that was very lucky.

JG: So was that undergraduate research program pivotal?

TJ: Yes, it was. Research experience, as well as a particular talk that I happened to go to as an undergraduate, were huge factors in my decision to go into mathematical biology. Going to talks was required as part of the REU program; I would probably never have drifted into a math seminar as an undergraduate if it weren't required. I heard a talk by James Murray on how a leopard gets his spots. I didn't understand why this talk should be in the math department because it didn't seem like it should have anything to do with math. Even though I didn't understand very much of the talk, I saw that there were some exciting possibilities in mathematical biology, and I knew that that was the direction that I wanted to go in when I went on to graduate school.

JG: You and your husband sometimes work together on research projects. Is that harder or easier than working with someone who is just a colleague?

TJ: That's a tough question. In some ways it's easier, because we were trained the same way, we speak the same language as far as math and biology go, and our ideas often complement each other's. It's kind of nice to talk to someone who complements you that way.

Learning to talk math biology to biologists has been a process. It started when I was in graduate school. Luckily, my advisor pushed us out into the sciences. I was interested in cancer, so he made me talk to people who were working on cancer. I think that the fact that I started learning to communicate at that stage in my career has helped me today. That's something that I try to do with my students: to make sure that they're learning to communicate, to understand problems and be able to communicate what they've done mathematically to the audience that it's intended for, which is biologists.

JG: Your research must require you to spend a lot of time learning biology.

TJ: Yes. My experience with biology in high school and as an undergraduate was very minimal, so when I hit graduate school and made a commitment to working on biological problems, I had to really hit the books. I focused mainly on the biology that was relevant to cancer. By no means am I an expert on biology, I don't even have anywhere near a degree in biology, but my strategy has been to focus on the particular aspects that I work on.

What I find really exciting for those who are coming up now is that they don't have to do that, they don't have to be trained as a mathematician and then learn biology or be trained as a biologist and learn some math later. There are many programs now that are trying to get dual training at the very earliest stages in place. I find that prospect really exciting for these students and I try to convey that enthusiasm so they see what an opportunity they have, an op-

portunity that I wish I had when I was coming up.

JG: Do you attend biology colloquia and seminars?

TJ: Yes, I do, even when the thrust isn't mathematical. I think that those are sometimes the most exciting. I always do that when I am looking for a new project. That's the best place to find a new project, at a biological seminar. You see all kinds of experiments, and the wheels start turning about what kind of quantitative things you can do to help address the questions they're interested in, and often that leads to collaborations.

JG: I know someone who got interested in mathematical biology and started attending weekly biology seminars. He was surprised by the amount of arguing and criticism that went on. Have you been to biology seminars like that?

TJ: I have been to a few of those. At journal clubs where a paper is assigned, people rip it apart. It's a different culture over there. The students in biology seem to learn early that it's okay to critique published works. In math and even in applied math, when you read a paper, you believe everything that's in it. The biologists are on the other end of the spectrum. They go really, really deeply into what's been done before. I think that that's good, because they can then see how to advance science by doing things differently.

JG: In math we have proofs, and once something has been proven it's very difficult to overturn it. So maybe there is more room for speculation in biology.

TJ: Yes, there definitely is. And in math, if you read a proof that's really elegant and beautiful, that's the end point, and people don't ask themselves "Could I have done this differently?"

JG: Your NSF SUBMERGE grant seems like a very exciting project.

TJ: It's brand new, and we're going to start it this summer. SUBMERGE stands for Supplying Undergraduate Biology and Mathematics Education and Research Group Experiences. The goal is to bring teams of undergraduates together to work for an extended period of time on projects at the interface of math and biology. The way we plan to do it is to have two students who are concentrating in math working with two students who are concentrating in biology to form a four-person team co-mentored by a faculty member from the mathematical sciences and a faculty member from the biological sciences. They'll begin this summer with some intensive training to get everyone up to speed and on the same page and then they'll work on research projects during the year and take a specialized set of courses.

The goal really is to get them to do something that is cutting edge. The research projects, which I think is really the most exciting part of this, are coming from labs right there on campus, and in some cases are extending existing collaborations, but what I think is really exciting is that new collaborations will be forming between the students and the two faculty members.

JG: That's another significant difference between math and biology. Biologists seem to tend to work in fairly large teams.

TJ: Yes, they work in large labs and in large groups, and that is very different from the way mathematicians tend to work. I think that it's good for students who are concentrating in math to see how biologists run labs and it's also good for the biologists to see how mathematicians normally work. They need to find a happy medium if their goal is to be a scientist who works on problems that lie right at the middle of the two.

JG: Tell me about the mathematical biology research group at Michigan.

TJ: There are only about four serious math biologists in the department, plus a few others who dabble in math biology around the periphery of the subject. The four of us make up the core, but the group also includes faculty from biology and from the medical school. When you look at Michigan, it might not be easy to see from the outside how much mathematical biology is being done there. This group is trying to bring all those people together, at least for short periods of time. There's a seminar series, a distinguished lecture series, graduate students do a brown bag lunch where they talk about their own research to their peers. I currently have four graduate students and two post-docs and one undergraduate working with me.

JG: Do you a have special interest in getting students from underrepresented groups involved in undergraduate research?

TJ: Yes, I do. I have an interest in that at the undergraduate and at the graduate level. At Michigan, it's hard to find underrepresented minorities who are majoring in math. So what I do is spend time as an undergraduate advisor, so that I get to see a wide variety of students, some of whom may be thinking about math, and I get to give my input and maybe mentor and nurture the underrepresented minorities who I see in that way.

Teaching introductory courses has also helped me to find students who might want to major in math. Many students from underrepresented groups come in without testing out of calculus, so they're taking calculus or maybe a course before calculus. That's where I find a lot of students who just need a little encouragement to do well in math, and then they can go on and declare a math major and actually succeed in it. So it's not easy to find them, but once you find them it only takes a little encouragement and for someone to show a little interest for them to realize this could actually be a possibility for them.

JG: A major problem that math has is that when students come out of high school, they don't think of math as a career, even if they're good at math.

TJ: Our web site has a link that addresses that question. It shows some career choices for mathematicians. It shows where some of our undergraduates have

gone, and what career paths some of our graduates have taken so that undergraduates can see some of their options and that there is a wide variety of opportunities.

JG: Have you written joint papers with biologists? Where might these be published?

TJ: Yes, I often write joint papers with biologists. In fact, the first papers that I did when I was a graduate student were with biologists, and I have continued to work with biologists. My most exciting work is hopefully still to come, and I will definitely have biological co-authors.

There are math biology journals that focus on publishing mathematical biology papers, and I publish in those. I really strive to publish in the biological journals of my fields. My field is cancer research, and the very top journals in this field are *Cancer Research* and *The British Journal of Cancer*. When I was starting out, it was very uncommon to see a mathematical modeling paper in one of those journals. Now it is becoming a little more commonplace. But it's still very difficult to get a mathematical modeling paper in the top biological journals.

JG: Some major research universities are making mathematical biology an area of special focus by putting a lot of resources into it. Is that true at Michigan?

TJ: Yes, Michigan is very interested in promoting math biology, and they are putting their money where their mouth is, so to speak. We had a college-wide theme semester in mathematical biology that got a lot of recognition for our group and for the subject.

JG: I noticed that you received a faculty award for teaching. Was there some particular facet of teaching that was a major factor in your getting it?

TJ: When I first got to Michigan, the only math biologist they had left, so I could come in and start developing courses. I started with the undergraduate courses in math biology, and they sort of took off. It's been a great experience.

JG: Does Michigan have a separate calculus course for biology students?

TJ: No, we don't yet. But as part of the SUBMERGE, that's something that could definitely happen. We're talking about getting calculus modules put into intro biology courses and putting biology modules into a calculus course. At the later levels, such as in differential equations, we're trying to do something similar. We're trying to get some experimental components put into the modeling courses, where part of the course will be to do some simple experiments to collect data and then model and analyze it.

JG: You said that there might be calculus modules put in biology courses. Does that mean that biology students take calculus before biology?

TJ: No, not right now, and that's a problem. One of the biggest problems we have is that students who are majoring in biology often wait until the very end to take their math requirements. We want to get that turned around a little bit, and maybe pilot something where math is incorporated gently into one of the biology courses.

JG: It seems that everything you do uses differential equations. Do you use any discrete mathematics?

TJ: It's true that most of my work uses continuous methods. But now there's a big buzz in the field for combining the two, looking at both continuous and discrete methods. For some things it makes sense to use continuous models, but for other things, like individual cells, it makes sense to treat them as discrete entities. I have a student right now who is building a model of blood vessel formation, and we are using discrete components for cells and continuous components for chemicals and things that govern how they move. This is really my first venture into discrete modeling, and I'm finding it very interesting and very applicable to the work I do.

JG: Have you used any combinatorics?

TJ: No, I haven't, but I have sat on a dissertation committee for several students who were interested in bioinformatics and used combinatorial techniques. But I haven't used it in my own research. I do think that that is a way to bridge more pure approaches and the biological sciences. People sometimes ask me if I always have to use differential equations. The answer is no, biology is so immense that there are questions that can be answered with almost any type of mathematics.

JG: What goals do you have for yourself 5 to 10 years down the line?

TJ: Hopefully I will be a full professor! I hope to still be doing research at the level that I'm doing it now, but at the same time I want to start switching gears to really focus on the issue of minority graduate education. I really would like to see the university that I'm associated with have significant numbers. Right now we're not there, but I think that there are a handful of us who are committed to working on that. Being still relatively junior, there has to be a trade-off between research and the other activities that you want to do. I see myself in a few years being able to handle switching gears a little bit better.

JG: Is there anything else you would like to point out?

TJ: It really does seem that luck has followed me throughout my career. I went to the University of Washington in hopes of working with a person I saw give a talk, and it worked out, I ended up getting my dissertation under Jim Murray. I also had the good fortune of being mentored as a post-doc by another leading figure in math biology, Mike Reed at Duke. I think I really have had these angels on my shoulder throughout my career, and I hope to be the angel on someone's shoulder as they come along.

The Council on Undergraduate Research as a Resource for Mathematicians

By Thomas Q. Sibley

The MAA CUPM Subcommittee on Research by Undergraduates would like to inform the mathematics community about the many organizations involved in the promotion of undergraduate research. In particular, attention should be called to the Council on Undergraduate Research (CUR), an interdisciplinary organization committed to fostering undergraduate research.

Started in 1978 by a group of chemists, CUR focuses on enabling undergraduate institutions to compete for research grants from the NSF and other governmental funding sources. Over time CUR has broadened its focus and developed an increasingly multidisciplinary flavor. During the 80s it added divisions for other natural sciences and opened its membership to faculty and administrators from all institutions. Our own MAA President, Joe Gallian, was a founding member of the Mathematics/Computer Science division in 1989. Since then, CUR has added divisions in the social sciences, an at-large division (primarily for administrators) and one for directors of undergraduate research programs.

Funding for undergraduate research has been a major focus for CUR. Joe Gallian notes that CUR was instrumental in lobbying for the Research Experiences for Undergraduates program (REU) after the Reagan administration phased out its predecessor (URP) in the 80s. CUR didn't just wait for government-funded REUs to bolster summer research opportunities. It also found corporate funding to support undergraduates doing summer research at colleges and universities. In recent years these funds have dried up, but they provided important interim support. Many schools now provide their own funding for undergraduate research, in addition to governmental and other funding.

CUR has some direct impact on undergraduates, even though CUR does not have student members. "Posters on the Hill," a different sort of lobbying effort by CUR, showcases undergraduates talking about their research to senators and representatives. Recently, this successful program has been imitated at a number of state capitols. Since 2001 the Mathematics/Computer Science Division of CUR has sponsored prizes for the best undergraduate research talks at the MAA and Pi Mu Epsilon paper sessions at MathFest. Although other organizations give prizes there, only the CUR prizes are specifically for original research.

Another event featuring undergraduate research, NCUR, is often confused with CUR. NCUR, the National Conferences on Undergraduate Research, sponsors an annual conference of the same name where undergraduates can present their research. Although CUR and NCUR as organizations talk to each other, they are distinct.

How can mathematicians benefit from CUR? Every two years CUR hosts a national conference on fostering undergraduate research, filled with workshops, talks and opportunities to interact with others committed to undergraduate research. (The next one will be June 21–24, 2008 at the College of St. Benedict in Minnesota.) Secondly, mathematicians can use electronic and in-person connections through CUR to develop interdisciplinary collaborations for undergraduate research. Also, CUR provides information and advice on supporting and mentoring undergraduate research in its journal, pamphlets, institutes, web pages, and personal exchanges.

Some broader initiatives by CUR benefit all faculty members mentoring undergraduate research. CUR supports the institutionalization of undergraduate research throughout colleges and universities. For instance, a CUR institute "Institutionalizing Undergraduate Research" helps teams of faculty and administrators make undergraduate research a permanent focus throughout a school (http://www.cur.org/institutes).

Schools that are institutional members get several individual memberships, which tend to go to administrators. These memberships can help educate administrators on the importance and challenges of undergraduate research, as well as the range of what research is. Since too few non-mathematicians understand the nature of mathematical research, mathematicians can benefit from any such increased understanding and appreciation. We would also suggest the article by the CUPM Subcommittee on the costs and benefits of mathematics research by undergraduates to faculty and the institution. See http://www.maa.org/cupm/CUPM-UG-research.pdf.

CUR welcomes everyone who wants to learn more about mentoring and supporting undergraduate research as well as all with ideas to share. Visit the CUR website at http://www.CUR.org.

Thomas Q. Sibley is professor of mathematics at St. John's University and the College of St. Benedict. He is currently the president of the North Central Section of the MAA.

2007 Award Winners for

Pacific Northwest

Duane DeTemple
Washington State University

North Central

Karen Saxe
Macalester College

Northern California, Nevada, Hawaii

William Fisher
California State University, Chico

Intermountain

Peter Alfeld
University of Utah

Oklahoma-Arkansas

Joan E. Bell
Northeastern University

Southern California-Nevada

Jon McCammond
University of California, Santa Barbara

Texas

Minerva Cordero-Epperson
The University of Texas at Arlington

Winners Not Pictured:

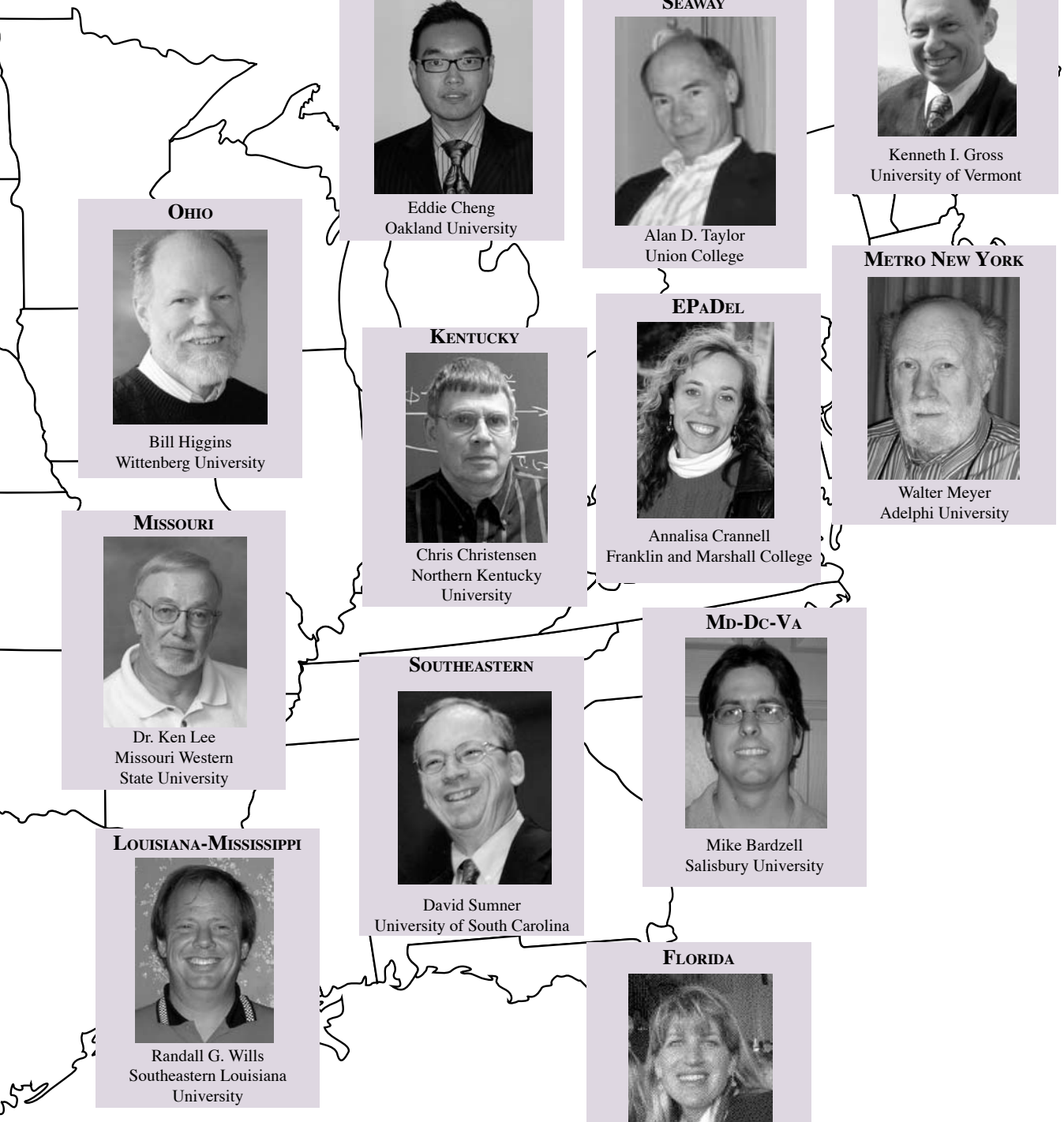
Illinois Section:
Dennis Schneider, Knox College

Nebraska-SE South Dakota Section:
Jim Johnson, Doane College

Rocky Mountain Section:
Lynne Ipiña, University of Wyoming

Southwestern Section:
Glenn Hurlbert, Arizona State University

Distinguished Teaching



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Florida

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Saint Leo University

MAA Prizes and Awards at MathFest 2007

Every year, the MAA announces several prizes and awards at MathFest, including the Alder Awards for distinguished teaching by a beginning college or university mathematics faculty member and the various awards for expository writing published in one of the Association's publications. This year's winners are listed below. More information can be found on the MAA web site, including citations, responses, and photographs of the winners. More photographs will appear in the October issue of FOCUS.

Carl B. Allendoerfer Awards
For expository articles published in *Mathematics Magazine*

Carol V. Lutzer
"Hammer Juggling, Rotational Instability and Eigenvalues"
Mathematics Magazine
Vol. 79, no. 4, 2006, pp. 243–250.

Saul Stahl
"The Evolution of the Normal Distribution"
Mathematics Magazine
Vol. 79, no. 2, 2006, pp. 96–113.

Trevor Evans Awards
For expository articles published in *Math Horizons*

Robert Bosch
"Opt Art"
Math Horizons
February 2006, pp 6–9.

Adrian Rice and Eve Torrence
"Lewis Carroll's Condensation Method for Evaluating Determinants"
Math Horizons
November 2006, pp. 12–15.

Lester R. Ford Awards
For expository articles published in *The American Mathematical Monthly*

Andrew Granville and Greg Martin
"Prime Number Races"
American Mathematical Monthly
Vol. 113, no. 1, 2006, pp. 1–33.

Jeffrey C. Lagarias
"Wild and Wooley Numbers"
American Mathematical Monthly
Vol. 113, no. 2, 2006, pp. 97–108.

Lluís Bibiloni, Jaume Paradís and Pelegrí Viader
"On a Series of Goldbach and Euler"
American Mathematical Monthly
Vol. 113, no. 3, 2006, pp. 206–220.

Harold P. Boas
"Reflections on the Arbelos"
American Mathematical Monthly
vol. 113, no. 3, 2006, pp. 236–249.

Michael Mossinghoff
"A $1 Problem"
American Mathematical Monthly
vol. 113, no. 5, 2006, pp. 385–402.

George Pólya Awards
For expository articles published in the *College Mathematics Journal*

Richard Jerrard, Joel Schneider, Ralph Smallberg, and John Wetzel
"Straw in a Box"
College Mathematics Journal
vol. 37, no. 2, March 2006, pp. 93–102.

Allen Schwenk
"Distortion of Average Class Size: The Lake Wobegon Effect"
College Mathematics Journal
vol. 37, no. 4, September 2006, pp. 293–296.

Merten M. Hasse Prize
For a noteworthy expository paper appearing in an MAA publication one of whose authors is a younger mathematician

Franklin Mendivil
"Fractals, Graphs, and Fields"
American Mathematical Monthly
Vol. 110, No. 6, June 2003, pp. 503–515.

Henry L. Alder Award
For Distinguished Teaching by a Beginning College or University Mathematics Faculty Member

Timothy Chartier
Davidson College

Satyan Devadoss
Williams College

Darren Narayan
Rochester Institute of Technology

Introducing…

a new column on MAA Online

Experiences • Program Models • Research Projects

Resources For Undergraduate Research in Mathematics

Funding Sources • Conferences • Research Articles

This new column will provide an array of resources for faculty interested in mentoring and promoting undergraduate research in mathematics. We invite your submissions with student and faculty experiences, research articles, announcements and other ideas to encourage student and faculty participation in undergraduate research.

www.maa.org

Send submissions to co-editors:

Darren A. Narayan, darren.narayan@rit.edu

Sarah Spence Adams, sarah.adams@olin.edu

In Memoriam

Deborah Tepper Haimo, 1921–2007

Former MAA President Deborah Tepper Haimo died at the age of 85 in Claremont, Calif. on May 17, 2007. Haimo served as MAA President in 1991–92. During her tenure as president, she helped reorganize the MAA's committee structure, created the Franklin and Deborah Tepper Haimo award honoring outstanding teaching, and encouraged the participation of women in mathematics at every level and in the MAA.

Haimo attended Radcliffe College as an undergraduate and received her Ph.D. from Harvard in 1964. She went on to a distinguished teaching career at the University of Missouri-St. Louis. After retirement she moved to La Jolla, CA, and became active in the department of mathematics at the University of California, San Diego, participating in seminars and social events.

MAA Secretary Martha Siegel said, "Many of us who knew and worked with Debbie found her an excellent role model, a person with high personal and professional standards. She had a strong work ethic in everything she tackled. She made many significant contributions to the MAA when she served as President in 1991 and 1992. Our Association owes a great deal to her leadership."

Deborah Tepper Haimo is survived by five children; Zara, Ethan, Nina, Leah, and Varda Tepper Haimo, 13 grandchildren and one great grandchild.

See page 21 for an extended article on Haimo.

John Todd, 1911–2007

John "Jack" Todd, a pioneer in computing and numerical analysis, died in Pasadena, CA on June 21. Born in 1911, Todd grew up in Northern Ireland and did his graduate studies at Cambridge University under J.E. Littlewood and G.H. Hardy. In 1938, he married the mathematician Olga Taussky, who became one of the first women to make a mark in 20th-century mathematics. During World War II, Todd was assigned to Portsmouth to help develop methods for "degaussing" — that is, demagnetizing — transport ships that might be targets of German U-boats. Near the close of the war, Todd prevented Allied forces from turning to rubble the Mathematical Research Institute, in Oberwolfach, where the University of Freiburg was sheltering its mathematicians. It was "probably the best thing I ever did for mathematics," he later said.

After the war, Todd returned to teaching at King's College, developing a specialty in numerical analysis. In 1947, he and his wife moved to UCLA to help establish the National Applied Mathematics Laboratories, part of the National Bureau of Standards. Todd later became chief of the Bureau's computation laboratory, in Washington, DC, helping to launch the field of high-speed computer programming and analysis. In 1957, Todd moved to Caltech, where he and his wife remained until retirement.

For an in-depth profile of John Todd, see "John Todd — Numerical Mathematics Pioneer," published in the January 2007 issue of *College Mathematics Journal*.

A. B. Willcox, 1925–2007

Former MAA Executive Director Alfred B. Willcox died on May 15, 2007, at age 81. Affectionately known as "A.B.," Willcox taught at Amherst College, served as Executive Director of the Committee on the Undergraduate Program in Mathematics, and in 1968 became MAA's second Executive Director.

Announcing his retirement in FOCUS in June 1989, when the MAA's membership stood at "27,500 members in good standing," Willcox said, "our operational base is strong, our programs thrive, and our confidence in the future strength of the Association is supreme."

"I have enjoyed and been rewarded and stimulated by twenty-one years as your Executive Director. As everyone over 60 knows, one pays a toll for so many years of sustained stimulation. I look forward to a change of focus… Most of all I look forward to quite a few years of pleasure and pride as I watch the MAA prosper and grow in service to collegiate mathematics."

His change of focus included moving to Annapolis, Md., to take up sailing with his wife, Shirley. "A.B." is survived by his wife of more than 50 years, Shirley; his children David, Mark, Peter, and Daniel; and several grandchildren. He'll be missed by all of us, both inside and outside the Association, who knew and loved him.

A longer article on Willcox will appear in a future issue of FOCUS.

James Eells, 1926 – 2007

In our May-June issue, we included (page 17) a short notice on the death of James Eells. Unfortunately, we spelled Eells' name incorrectly. We deeply regret the error. To make amends, we print here a corrected notice.

James Eells died on February 14 at the age of 80. Eells graduated from Bowdoin College and then from Harvard University. His doctoral work was completed in 1954, under Hassler Whitney. After holding several prestigious positions in the U.S., he moved to the United Kingdom and became Professor of Analysis at the University of Warwick. He was later named the first head of the mathematics group at the International Center of Theoretical Physics in Trieste, Italy. His research dealt with harmonic maps, geometric evolutions, and stochastic analysis.

***In Memoriam* Online**

http://www.maa.org/news/inmemoriam.html.

We maintain an *In Memoriam* page at the MAA web site. It contains short death notices for MAA members and other people known to our members. Short obituaries for this page may be submitted directly to Carol Baxter at cbaxter@maa.org.

Fond Memories of My Friend Deborah Tepper Haimo, 1921-2007

By Carole B. Lacampagne

The year was 1988, the place Vienna, Austria. She was striding one step ahead of me, dragging her wheely suitcase, head held high, determined, a woman on a mission. This is how I'll always remember my friend Debbie Haimo.

Debbie had a rather exotic childhood — she was born in Odessa, Ukraine, and lived in Israel before coming to the United States when she was 11. Her father was a portrait painter, which precipitated the family wandering around the world. Wherever Debbie lived, many of her father's portraits adorned the walls of her homes.

Debbie spent her undergraduate years at Radcliffe College, with considerable time in mathematics courses at Harvard. It was in a Harvard graduate course in mathematics that she met her husband Franklin. When Franklin received his Ph.D., they were married. Her own Ph.D. was delayed by bearing and raising five children and an interruption caused by her then thesis advisor Hassler Whitney's move to the Institute for Advanced Study. She finally completed it under David Widder in 1964. Most of Debbie's work was in harmonic analysis relating to special equations, the heat equation and extensions of it, and various integral transformations and series, often associated with Bessel functions or Hermite and Laguerre polynomials. She published over 40 mathematics papers, two of them with Richard Askey, who remained her friend and colleague throughout her life.

With Franklin at Washington University in St. Louis, and five children to raise, Debbie found time to teach mathematics courses at Washington University and Southern Illinois University and to serve as editor of the "Math Notes" of the *American Mathematical Monthly* with Franklin. In 1968 she was hired by the University of Missouri-St. Louis to build their mathematics department, which she did. She remained there until her retirement in 1992.

Debbie's involvement with the MAA dates back to her graduate days. Over the years, she served on numerous MAA committees — on the Teaching of Undergraduate Mathematics, the Nominating Committee, the Program Committee, and the Committee for the Participation of Women in Mathematics. These activities culminated in her serving as President of the MAA (1991-1992). Her goal as President was to restructure the very cumbersome committees into councils. According to Marcia Sward,

> *One goal which Debbie did not achieve was reduction in the number of committees. Knowing how determined she could be, the staff and officers tended to believe her when she said she was going to end her term as President with fewer committees that when she started. Rumor has it that there were some under-the-table bets on this! But at the end of her time, there were several more committees than in the beginning. There were just too many good things to be done and too many people willing to devote endless hours to making them happen. Debbie was just too good a role model!*

A lasting contribution to her concern for mathematics teaching at the college level was her instituting an annual MAA award, the Deborah and Franklin Tepper Haimo Awards for Distinguished College and University Teaching of Mathematics.

But Debbie's service to academia extended beyond the MAA. She served on numerous national and international panels and committees on mathematics and its teaching, was a trustee of Radcliffe College, and was a member of the Board of Overseers of Harvard University.

At the time of her retirement, she told me that she was tired of the cold weather and planned to move to La Jolla, California, where it was always warm, and she could have a wonderful view of the Pacific Ocean. Despite my warning against moving to an entirely new community with few friends and relatives nearby, Debbie did indeed make that move. She bought a lovely condominium overlooking the ocean where she entertained many of us at the Joint Meetings in San Diego. Her mathematical interests turned to solving California's problems with school mathematics and to attending the many interesting mathematics seminars—and the parties that followed at—the University of California, San Diego, where she held an honorary position.

Debbie was one of a generation of women in mathematics who set aside or downgraded their careers in mathematics temporarily while helping their husbands begin their careers and raising a brood of talented children. Today's young women in mathematics face different problems, but I hope they will look back fondly at the problems and triumphs that Deborah Tepper Haimo and other women in mathematics in the mid-twentieth century faced.

Many of us who cared so deeply about her, last saw Debbie at the 2004 Joint Meetings in Phoenix — still striding along, with the help of her detested cane, still determined, a woman on a mission. We will all miss her.

After working at Northern Illinois University, DoE, RAND, and the MSEB, Carole Lacampagne is now semi-retired. She thanks Richard Askey, Jerry Porter, and Marcia Sward for sharing their memories of Debbie.

"Teaching Us to Number Our Days"

By Jacqueline Brannon Giles

Years ago, the University of Houston–Downtown hosted an MAA meeting in Houston, Texas, at the Sofitel Hotel, near the George Bush Intercontinental Airport. I was encouraged to attend that meeting. Al Willcox helped me enter the door, and Debbie Haimo ushered me into a more functional position.

In 1990, my article on "Black Pioneers in Mathematics" was published, and while I was being introduced at the MAA meeting, Florence Fasanelli told Haimo about my article. She was very gracious and kind, and she asked me whether I might want to get more involved with MAA. I said "yes." A few weeks passed and then I was nominated to be a part of the Professional Development Committee, led by Beverly Anderson of the University of the District of Columbia.

Later, Jerry Porter led the Professional Development Committee, and he mentored me, and strategically positioned me with Bonnie Gold. Well, the rest is history.

Another memory is my phone call in August 1989 to Dr. Willcox. Willcox nominated me to the early version of the Joint Policy Board for Mathematics. So 2007 is the year that we have lost two great mentors: Haimo, the former MAA President, and Willcox, the 21 year veteran Executive Director of MAA.

The departures of Willcox and Haimo from this realm of my (our) reality remind me to be grateful to all who have contributed to those of us who aspired to make contributions in this great organization. As I recall how what they did flowed into my professional life, I wonder about what flowed out of my professional life during my many days of involvement, from the level of the Board of Governors to various committees.

Let us be wise and continue to strive for a strong, diverse organization, for we can only honor what they did by building on the foundation laid by them. I am certain that there are others like me who say "thank you" to the families who shared these wonderful people with us.

Jackie Giles is a member of the FOCUS editorial board. She teaches at Central College, part of the Houston Community College System.

Found Math

Our resident mathematician, Cheapano Fibonacci, has come up with some amazingly low fares for you — as low as $1 each way! Cheapano comes from a long line of famous Fibonacci mathematicians, but he is the first to offer fares for only $1 each way! We invite you to follow Cheapano's number sequence to great fare sales. We are offering fares from $1*, $2*, $3*, $5*, $8*, $13*, $21*, $34*, $55*, $89*, $144* and $233* each way. Even though the Fibonacci numbers keep going up and up, Cheapano stopped at 233; we are an Ultra Low Cost Carrier after all!*

(Spirit Air web site, June 27, 2007; thanks to Jenny Quinn)

Subsidized Childcare Services at the Joint Mathematics Meetings

"Love it! And the boys do too!"

The American Mathematical Society and the Mathematical Association of America are pleased to announce that for the fourth year they are offering and significantly subsidizing childcare services at the Joint Mathematics Meetings (JMM) — this time in San Diego, CA, January 6–9, 2008. Child care will be offered to parents through KiddieCorp, an organization that has been providing high quality programs for children of all ages at meetings throughout the U.S. and Canada since 1986.

Parents registered as participants at JMM can take their children for a fun few days and still enjoy the meeting. While attendees are in sessions KiddieCorp will engage children in popular tried and true games and activities including arts & crafts, music & movement, board games, story time, and dramatic play. The program offers theme activities for the older children, specially designed so that children can make friends easily in a comfortable, safe, and happy environment.

The feedback on the service in past meetings has been enthusiastic: "Very convenient and useful. I hope it will continue to be offered." "I really appreciated the service." "Wonderful! Please do it again!"

The dates and times for the program are Sunday through Wednesday, January 6–9, 2008, 8:00 a.m. to 5:00 p.m. each day. It will be located at the San Diego Marriott. The service is for children 6 months through 12 years old. Parents are encouraged to bring snacks and beverages for their children but items such as juice boxes, Cheerios and crackers will be provided. KiddieCorp can arrange meals for children at cost plus 15% or parents can be responsible for meals for their children.

Registration will be open in September 2007, with the deadline of December 9, 2007. Availability is limited and will be handled on a first-come, first-served basis. The registration fee is $30 per family (nonrefundable), plus $9 per hour per child, $7 per hour per child for graduate students. Full payment is due at the time of registration with KiddieCorp. To learn more about the service, policies regarding cancellation and late child pick-up fees, and to register, go to https://www.kiddiecorp.com/jmmkids.htm or call KiddieCorp at (858) 455-1718 to request a form.

Come to the Joint Mathematics Meetings in San Diego, January 6-9: Meet old and new colleagues, attend sessions, visit the exhibits — and bring your children!

AWM Announces Search for Executive Director

After a short term as Executive Director of the Association for Women in Mathematics, Jennifer Quinn has stepped down as of June 30, 2007 to accept a faculty position at the University of Washington, Tacoma. "I consider myself very fortunate to have served as Executive Director of AWM," says Quinn, "It was a rare opportunity to work with many creative, dedicated, and talented women mathematicians."

Over the last few years, AWM has seen many changes — from hiring an association management company to hiring a new Executive Director to restructuring the Executive Committee with task-oriented portfolios. During her time as Executive Director, Quinn successfully led membership drives, grant writing and reporting, volunteer efforts, and new initiatives.

Outgoing AWM Executive Director Jenny Quinn.

The search for a new executive director is now under way. AWM is looking for an outstanding individual who is passionate about supporting women in mathematics. The part-time position can be combined with an existing academic appointment via course reductions.

The AWM office is in the DC area, but the geographic base of the Executive Director can be anywhere in North America. Nominations, inquiries, and leads may be directed to AWM President Cathy Kessel at cbkessel@earthlink.net. For more information on the position and application details see http://www.awm-math.org/EDsearch.

Building a Successful Actuarial Science Program: Five Key Components

By Mark M. Maxwell

An actuary is a business professional who analyzes the financial consequences of risk. Actuaries use mathematics, statistics and financial theory to study uncertain future events, especially those of concern to insurance and pension programs. Advancement in the actuarial profession is predicated upon passing a lengthy and arduous series of mathematics-based examinations. Therefore, many actuarial programs are housed within mathematics departments.

Actuaries are valued for their capacity to solve industry problems and develop financial forecasting models. As examples, casualty actuaries determine auto insurance premiums based on client characteristics like age, gender, driving history, vehicle type, deductible, and location. Consulting actuaries determine pension contributions based on employee characteristics, work environment, and promised benefits within the framework of government regulations and state mandates. Life and health actuaries perform similar functions when pricing term insurance policies or designing medical plans.

There are approximately 21,000 actuaries credentialed by one of the two major professional societies: the Society of Actuaries (SOA) and the Casualty Actuarial Society (CAS). By comparison, there are 50 times as many lawyers and 100 times as many accountants. In its last five issues, *The Jobs Rated Almanac* consistently ranked actuary as one of the top two professions, based upon work environment, income, outlook, physical demands, security, and stress. Actuary was ranked #1 in 1988, #2 (to software engineer) in 1992, #1 in 1995, # 2 (to webmaster) in 1999, and #2 (to biologist) in 2002.

Of the 2593 four-year colleges in the United States, only 149 are listed by the SOA as having some kind of actuarial program. There are 78 programs classified as introductory. Of the 71 advanced programs, 32 have graduate education and/or research components.

Would developing an actuarial program be beneficial for your students, your department, your college, and yourself? We believe so. Your students will be able to apply their mathematics aptitude and passion in their professions. Your department and college will benefit from a new source of academically talented mathematics majors. You will benefit from the satisfaction of mentoring motivated young women and men whose achievements will make you proud.

Faculty face inevitable tradeoffs in time between teaching, service, and research. However, the investment in actuarial education can range along a continuum beginning with minimal advising and guidance through building an advanced actuarial program. This article will discuss five important factors in actuarial education that can help you determine your place along the continuum.

1. Students should strive to pass as many professional examinations as possible

A credentialed actuary has earned some professional designation (EA, ASA, FSA, ACAS, or FCAS). The credentialing process requires passing a series of rigorous and comprehensive examinations while in college and generally continuing through the early years of full-time employment. Exams pose a "trial by ordeal" that clearly identifies candidates with the right combination of ability and determination.

For candidates preparing for an actuarial exam, the practiced credo is to study 100 hours for each hour of the exam. This translates to 300 hours for the jointly administered SOA/CAS Exam P/1: Probability. Preparation time is necessary but not sufficient to guarantee success on these exams, with historic pass rates on this calculus-based probability exam averaging near 40%. Subsequent examinations have similar pass rates.

Many mathematics departments offer a calculus-based probability course that covers the material on the probability exam. Faculty may simply advise students to prepare for the exam, organize student study groups, or even conduct problem-solving study sessions.

Introductory actuarial science programs have courses that help prepare students for the 2.5 hour SOA/CAS Exam FM: Financial Mathematics. Geometric series are seen in action when present values of assets/liabilities are computed by discounting cash flows at appropriate interest rates.

Advanced actuarial science courses require highly specialized topics in survival and frequency models, life contingencies, credibility, simulation, and construction of parametric models. The advanced examinations and fellowship modules are tailored to specific lines of work (finance, investments, individual life insurance and annuities, as well as group life and health insurance). The best employers are generous with study time and resources to support employees as they progress toward an actuarial credential. One can find detailed syllabi on the Society web sites, http://www.casact.org and http://www.soa.org.

There are benefits to investing long hours in preparation for an exam that you might pass. Exams serve to level the playing field for all students regardless of school or pedigree. Completed exams help employers discriminate between students more significantly than does grade point average, work experience, or other traditional résumé items. Passing subsequent exams will translate to greater employability and increased salary. After graduation, employers continue to tie compensation rewards and provide study time to progression through the credentialing process. Veteran can-

didates long for the good-old college days with a dearth of responsibility and a glut of available hours to study.

2. Students should obtain internships

Summer internships should be thought of as well-paid three month job interviews. Employers evaluate the intern's work ethic, versatility, ability to work within their corporate environment, proficiency in writing and presentations, and capacity to meet deadlines and solve problems. Employers use their internship programs to identify talent, often creating full-time positions for their top performing interns.

Gaining a summer internship is a competitive process with offers frequently being made in January. Employers might require one actuarial exam passed and have other filters like class standing, GPA, or willingness to relocate. Major employers, as well as small boutique actuarial firms, hire skilled students early in college and before passing an exam. School year internships or cooperative educational agreements are available at many universities in proximity to consulting or insurance firms.

The best way for a college student to learn about the various categories of actuarial work is to experience them firsthand. A variety of internship experiences provides valuable comparisons for students. Internships also provide relevant work experience. Students witness the specific corporate environment, are exposed to the type of work of a company, and network with potential co-workers. Compensation packages are consistent between employers and it is common for students to select their first actuarial company based upon the people they have worked with, not on the highest initial salary. On a student résumé, internship experiences are second in importance only to passed examinations.

3. Programs need to recruit students aggressively

Due to the nature of the professional exam system, a vibrant actuarial program requires motivated students. Fortunately, those same students are attracted to the field.

Since many high school and college students are unaware of this obscure profession, some degree of active encouragement is essential for any level of program. Recruiting future actuaries may be quite different than recruiting typical college students and is similar to recruiting college athletes. There is often a unique recruiting cycle and target audience. Qualified high school students boast attractive academic credentials, are actively recruited by other programs and universities, and receive significant scholarship aid. Ideally, high school sophomores and juniors are contacted. Experience shows that a program can develop by word-of-mouth and a few early success stories of students with exams passed, internships, and/or rewarding jobs.

4. Faculty should be passionate about the profession

A single dedicated and energetic faculty member can have a major impact on the success of students and the growth of an actuarial program. Involved faculty can develop relationships with employers, maintain contact with graduates, adjust curriculum, cooperate with other departments, recruit students, and stay enlightened about the profession. An ambitious professor at a smaller school might work with enrollment to decide the target audience, create direct mail pieces, meet with prospects on campus visits, train the revolving door of enrollment managers, and host various enrollment programs.

Since passing actuarial exams is crucial to a student's success, faculty must be willing to provide assistance beyond the classroom to those students who are motivated and determined to pass. Program credibility can be grown with faculty earning an actuarial credential or becoming active in the educational and/or research aspects of the profession. By far, the most important and rewarding tasks for faculty is teaching gifted students in and outside of the classroom.

5. Students and alumni — you are what you produce

Ultimately an actuarial science program will be defined by the accomplishments of its students. It is the student who dedicates months studying hundreds of hours in preparation for the examinations. It is the student who develops communication skills and represents themselves and the program during internships. It is the student who becomes tomorrow's actuary. It is the student who combines business acumen with technical and communication skills to pursue new opportunities. And it is the alumni who become the strongest advocates for your actuarial program. Those who maximize their ability with their work-ethic and dedication will become the most accomplished students and future ambassadors for your program.

Risk is Opportunity

Actuarial programs are scalable in terms of students, faculty, and courses offered. The seed of an actuarial science program may be a mathematics or finance professor who counsels a few students to sit for the calculus-based probability examination. Growth can include a dedicated class in interest theory and some formal advising.

The word successful appears in the title of this article. What that word means for your university is entirely up to you. In addition to the five key components already discussed (exams, internships, recruitment, faculty, and students), a full-blown actuarial program will involve a supportive administration, an effective enrollment office, a partnership with industry, and an energetic student actuarial club. Initially, relatively modest investments of faculty time can serve to produce quite rewarding results.

Mark Maxwell is an Associate Professor and Program Director of Actuarial Science at Robert Morris University. The author welcomes all feedback to maxwell@rmu.edu.

Café Scientifique
Mathematics in the Microbrewery: Fermat Meets Fermentation?

By Gene Abrams

A mathematician walks into a bar. (Do you feel a joke coming on?) Almost 200 people are there, waiting to hear what he's got to say about current hot topics in mathematics research. (Ready for the punchline?)

Hey, *no joke!*

It's clear that over the past decade there has been a significant increase in the profile of mathematics and mathematicians in the general media (witness e.g. *Good Will Hunting, A Beautiful Mind, Proof, NUMB3RS*, etc.). So it probably should not have come as a surprise to me that the general public has developed an interest in what we mathematicians do for a living. In what ranks as one of the most satisfying and rewarding opportunities of my career, I had the privilege to share some of what I do with a group of tavern-goers who were thirsting for more than just the local microbrew.

Café Scientifique has its origins in the old French Café Philosophique, a general name for a forum in which the general public would gather over wine to discuss the important philosophical issues of the day. General public gatherings to discuss the important scientific issues of the day have recent genesis in the late 1990s in Leeds, England. The oldest Café Scientifique on this side of the Atlantic started in Denver in 2003, organized by Dr. J.J. Cohen (a professor of immunology at the University of Colorado Health Sciences Center). Since then an impressive number of such monthly gatherings have sprung up throughout the world, including nearly forty active Cafés in the United States alone.

The format of the Cafés is as follows. A scientist chats for 20 to 30 minutes about some current research work in her/his field. No overheads, no Powerpoints, no video clips, just talk. (Presenters are allowed to distribute a one page sheet of pertinent information if they so choose.)

J.J. Cohen introduces a speaker at the Denver Café Scientifique. Photo by Lisa Litzenberger; used with permission.

This overview is followed by a ten minute break (to let the patrons refill their glasses), which is then followed by an hour of question and answer from those assembled.

Not certain that there would be any questions (let alone an hour's worth) from the public about mathematics in general, or about what I do in particular, it was with some trepidation that I accepted Dr. Cohen's invitation to speak about mathematics research in the March 2006 Denver Café Scientifique. The Denver Cafés are held at the Wynkoop Microbrewery in downtown Denver. Just to give some context: the February 2006 Café topic was microbes in the water supply, while the April '06 version dealt with a satellite mission to Pluto.

I decided to break my 30 minute Mathematics Research chat into three pieces: What is it,? What's the Next Big Thing,? and Why Should You Care? For the "What is it?" chunk, I described how mathematics is not unlike other traditional sciences: people do basic mathematics, just as people do basic science, as well as application-driven mathematics, which is analogous to applied science. (I purposefully avoided using the phrases "pure" and "applied" mathematics.) For the "Next Big Thing," I spent ten minutes describing some of the more famous mathematics questions (e.g. Fermat's Last Theorem and the Four Color Problem), as well as the Clay Mathematics Institute Million Dollar Prizes.

And just "Why Should You Care?" Of course we all have our own personal answers to that question. What I shared with this general audience touched first on the artistic/aesthetic side, then on the "because it's there/perseverance" side, and, finally, the "basic science becomes applied science becomes part of your daily life" side. (Here I talked about Fermat's Little Theorem, then Euler's Generalization, then RSA encryption.)

I truly had no idea what to expect when the patrons returned from the ten minute glass-refilling break for the question and

answer portion of the evening. What I got was more than an hour of interesting, well-posed, thoughtful questions from all across the mathematical spectrum. The first question was from an elderly woman who wanted to know how I got interested in mathematics in the first place. [I liked science, but hated the labs.] A middle aged gentleman then asked whether Gödel's incompleteness result affected how I approach my research. [Not really for me personally, but, for example, I have colleagues are working in areas requiring extensions of ZFC.]

I was nervous that this relatively highbrow question about mathematical logic might stifle additional questions. Just the opposite! This question was followed by a constant stream of inquiries about such topics as:

• what I personally do research-wise [an area called Leavitt path algebras which combines graph theory with algebraic structures]

• whether mathematicians use computers in their research [not me personally, but computers have played a role in many branches of mathematics; I referred back to the Four Color Problem]

• what role math researchers can play in K–12 math education [training of teachers, working directly with K–12 students, and discussion of appropriate curricular topics]

• what Fibonacci numbers are, and where they come up in real life [spirals in nature]

• whether mathematics is discovered or invented [I think the former, but at least a few of my coauthors argue compellingly for the latter]

• what the status of the Poincaré conjecture is [a discussion of Perelman, the Fields Medal, and more about the Clay Mathematics Institute].

By the way, the Poincaré question was asked by a young man who identified himself as a high school student. I would guess there were at least a few dozen kids from this age group in attendance! (Under Colorado law, minors are allowed to be in a tavern as long as there is food served in the establishment as well.) These high school aged students really served as a nice addition to the discussion.

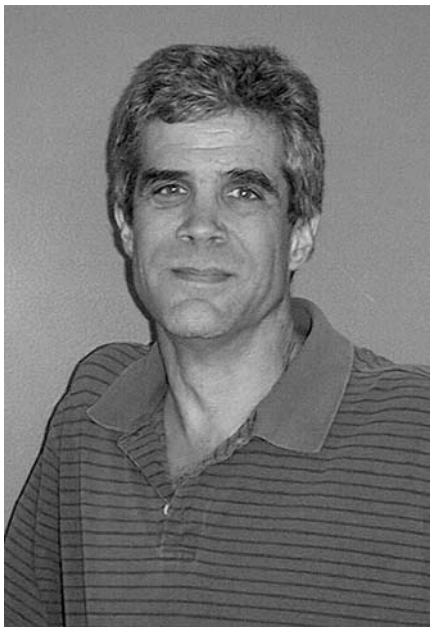

Photo of Gene Abrams used on the Café Scientifique web site to promote his talk.

And so it went for nearly 90 minutes. Finally Dr. Cohen had to politely end the session. A few people came up to me afterwards to ask more questions, and to share some of their personal experiences with mathematics in school (some good, some not so good). A beautiful end to the evening came when the previously mentioned elderly woman introduced herself to me, then told me that my passion for mathematics left her wanting to learn more about both mathematics and mathematicians. She then turned to my wife and asked "…is he that much fun at home!?"

As my wife and I drove home that night I had a sense of overwhelming reassurance that the general public is truly interested in what we mathematicians do, and how we go about doing it. Since the Denver presentation I have had the opportunity to do two more Cafés Scientifiques (at the Phantom Canyon Brewery in Colorado Springs, and at the Redfish Brewery in Boulder). While each of those attracted somewhat fewer participants, the questions asked were of similar depth and interest.

If there is a Café Scientifique (sometimes also called Science on Tap) in your community, I would strongly urge you to contact the local organizer to see whether you might arrange to do a presentation on mathematics research. See http://www.cafescientifique.org/worldlinks.htm for a list of Café Scientifiques. The Colorado Café homepage is http://CafeSciColorado.org. For those of you with *New York Times* access, see http://www.nytimes.com/2006/02/21/science/21cafe.html for an archived news story about Café Scientifique. (Thanks to the author of that story for the idea which spawned the opening few sentences of this article.)

The sheer pleasure you'll derive from the experience will be well worth your effort!

Gene Abrams is professor of mathematics at the University of Colorado at Colorado Springs. He has been a faculty member at UCCS since 1983. He is the author or coauthor of over thirty research articles in mathematics. In 1996 he earned lifelong designation as a University of Colorado system-wide President's Teaching Scholar. In 2002 he received the annual Burton W. Jones Outstanding Teaching Award from the Rocky Mountain Section of the Mathematical Association of America. He has been married since 1983 to his wife Mickey, who sometimes concedes that he is that much fun at home… They have two children, Ben and Ellen.

To and From the Editor

Letters to the Editor

Scholarship of Teaching and Learning

We couldn't agree more with James T. Fey (FOCUS, May/June 2007, "Mathematician Makes Pitch" on page 5) that the mathematics community should lend its support to the Scholarship of Teaching and Learning (SoTL) in mathematics and especially consider such work as appropriate mathematical scholarship. Toward that end, we note that the MAA has offered a minicourse on SoTL at the last two national meetings and will again include the Beginner's Guide to the Scholarship of Teaching and Learning in Mathematics among the 2008 minicourse offerings. In addition, the MAA sponsored a contributed paper session on SoTL in Mathematics at the 2007 Joint Meetings and will co-sponsor with the AMS a Special Session on Scholarship of Teaching and Learning in Mathematics at the 2008 Joint Meetings.

Mathematicians and mathematics educators have been doing this work as evidenced by the existence of the SIGMAA on RUME (Research on Undergraduate Mathematics Education). In 1999, Tom Banchoff, then President of the MAA, was one of the first mathematicians to be selected as a Carnegie Foundation CASTL scholar to investigate questions about teaching and learning (and to date more than ten mathematicians have been selected).

While the steps taken by the MAA mentioned above have served to raise the profile of this work, more could be done. An easy step could be to designate a regular space in one or more of the MAA journals to publish this work.

Curtis Bennett
Jacqueline Dewar
Loyola Marymount University

As someone who is both a mathematician and a mathematics educator, I am certainly interested in learning more about what research on teaching and learning mathematics has discovered. FOCUS regularly includes brief news items and reports in this area, and will continue to do so. Of course, we are a news magazine, so our reports will be journalistic rather than technical, practical rather than theoretical.

Mistaken Identity

I was somewhat puzzled concerning an item in the May/June issue of FOCUS. In the account of Joe Gallian's interview of Doron Zielberger, particular attention is given to something called "Wilf-Zielberger algorithmic proof theory." One of the things it supposedly proves is the identity

$$\sum_{k=0}^{n}(-1)^{k}\left(\frac{2n}{n+k}\right)^{3}=\frac{(3n)!}{n!^{3}}$$

Is there a misprint involved here (as I suspect there must be)?

Dale Geer
Oshkosh, WI

Congratulations on your sharp eyes: there certainly is a mistake! In fact, two misprints, one easy to spot, the other quite tricky. The easy one is to note that the fraction in parentheses is actually meant to be a binomial coefficient. The hard one to spot is that the range of summation is incorrect. The correct identity is

$$\sum_{k=-n}^{n}(-1)^{k}\binom{2n}{n+k}^{3}=\frac{(3n)!}{n!^{3}}$$

Notes From the Editor

About next Issue…

Longtime readers of FOCUS know that for a very long time the April and October issues have been dedicated exclusively to information about upcoming meetings. With the advent and ubiquity of the World Wide Web, however, it seems possible to move at least a part of that information online, freeing up some pages for editorial content. So expect to see a different October issue!

About half of the next issue will contain information about the Joint Mathematics Meetings, to be held in January in San Diego, CA. The other half will include some news from MathFest, including a photo spread, and perhaps a *Teaching Time Saver* and a few more articles. We're still trying to figure out exactly which items need to be in print and which should stay online. Feedback from our readers will be very important, so do let us know whether it worked.

About this Issue…

We are delighted that the *Archive of American Mathematics Spotlight* series is back! Carol Mead, the new archivist, promises to continue to send us fascinating material from the Archives. Teaching Time Savers is another series that is still going strong. I hope our readers enjoy these! Robert Vallin, the new MAA Associate Director for Student Programs, has provided the first article in a new series, which we call FOCUS on Students. We hope that both students and their teachers and advisors will profit from these articles.

About the Future…

We are continuing to look for articles in the What I Learned series, and we still hope some more people will stick their necks out and tell us What's the Best Textbook for various undergraduate courses. We also remind readers that we are always looking for interesting photos, "Found Math" items, and other filler material. Finally, we hope you will consider sending us short mathematical articles too: if there's a cool bit of mathematics you can explain in just a few paragraphs, we might be able to use it. The general guidelines on writing for FOCUS are online at http://www.maa.org/pubs/writingforfocus.html (alternatively, click on the "Publications" tab and scroll down).

Visiting the "Dark Side"

By Nora Franzova

Yes, I have visited the dark side and maybe it is not so dark after all. A colleague of mine convinced me to attend the SIGMAA RUME (Research in Undergraduate Mathematics) meeting in San Diego on February 22–25, 2007. To be completely honest, San Diego was the main reason for me attending. I am not involved in math education research and thus attending a specialized conference seemed a bit far fetched.

I consider myself a math purist — I like math for its tricks, puzzles, deep and mysterious connections. But I do spend most of my working time "selling" this mathematical beauty in undergraduate courses. Here I was at a meeting where this selling of mathematics was made into an art of its own.

What do you do at a conference, where you do not know the professional language and the etiquette? Of course, you visit the plenary sessions. And those were wonderful. Already in his first talk, Guershon Harel completely read my mind, describing the struggles of teaching linear algebra. Of course, I was struggling with terminology and professional language during all the plenary sessions. Talks by Dennis Pearl and David Tall led me to the point of wishing to know more. Then Rafael Núñez addressed this issue by analyzing language and gestures in teaching. I guess I finally got an OK from someone to wave my arms around while teaching.

I visited other talks, many by graduate students. I learned to take different points of view at my own teaching practices, and also learned that, yes, we all have to face the same crux when teaching limits, and proofs, and combinatorics, and shifting of graphs, and when our students are petrified by the "algebra minefield of dysfunctional met-befores" (as David Tall put it). The good news is that there are great resources available for those who want to try some other way.

So go ahead, visit the dark side sometimes. It just might shine some light on your problems.

Nora Franzova teaches at Langara College in Vancouver, BC.

Found Math

Now, the standard public key is typically a very large prime number hundreds of digits long that would take a hundred million PCs, working in parallel several thousand years, to figure out the two factors. However, while everyone knows the public key number, or at least your computer does, the only way to read what's being sent is by unlocking the public key using the two private keys. Those keys are the two prime factors of the public key and only your computer software knows what they are. To use a simple example, the number fifty might be the public key and ten and five would be the private keys. If you know the numbers ten and five you can read the transmission.

(From *Simple Genius,* by David Baldacci, described on the jacket as presenting "…a stunning world filled with elite mathematicians, physicists, war heroes, spies, and deadly field agents." Thanks to David Fowler, University of Nebraska–Lincoln.)

Faculty Fellow Programs to Help High School Students

By Rohitha Goonatilake

The improvement of mathematics courses in high schools has received much-needed attention by educational authorities recently. From algebra to calculus, students and teachers need any possible help that they can get.

Texas A&M International University, in Laredo, Texas, has created a program that has been effective in offering help. It is called the Faculty Fellows Program. Under this program, members of the university faculty interact with local high school teachers and their students, forming a partnership to develop Advanced Placement (AP) curricula, encourage students to pursue AP courses, and ensure greater success on AP exams. The faculty fellows visit their assigned high school as many as two to three times per week and do actual teaching. The high school students not only benefit from their teaching, but also get a taste of college teaching.

Area high schools choose to participate in the program. The participation of university faculty is voluntary. Both have been eager to participate. The quality of AP programs is coming under strict scrutiny, while at the same time educators are pushing to strengthen the academic level of high schools and their regular offerings. The faculty fellows program helped schools offer AP programs (which parents look for) and in general to improve their offerings.

University faculty learn a lot from such experiences. More importantly, they can make a real difference, both for the students and for the schools.

Rohitha Goonatilake is associate professor of mathematics at Texas A&M International University in Laredo, TX. He can be reached by email at harag@tamiu.edu.

Teaching Time Savers: Encouraging Contact Early in the Semester

By Chad Westphal

Each semester I tend to have a total of 50 to 70 new students, most of whom I've never met before. The beginning of the semester is busy and hectic, but it's important to start out on a positive note. I want to quickly learn all of my students' names, but at first they all look the same in class. I also want to encourage them to ask questions and take advantage of my office hours, but some students can't muster the nerve to make a first contact outside class, and especially to admit they don't understand something. If a student falls behind or has a very weak background, it may take me weeks to catch on to this.

Even in a small class, it can take half of the semester to make sure I have all the names and faces matched up, unless I really work at it. It's embarrassing to have to ask a student's name after the second exam. I've found a nice way to deal with these issues at the beginning of the semester. Though it doesn't seem like a real time saver at first, it tends to pay off in the long run.

On the first day of class I hand out a questionnaire with the standard questions: what is your major, what other classes are you taking, what are your hobbies, etc. But instead of collecting it in class, I offer a few points of extra credit if they return it to me in my office sometime during the first week of classes. It can be during office hours or any time my door is open, as long as they give it to me in person. They're usually very happy to do this — who wouldn't jump at the opportunity to start the course with over 100 percent?

When they come in, I glance over the questionnaire and ask a few questions: how do you like your classes, how long have you played the guitar, are you really going to work 30 hours per week this semester? These conversations usually last less than five minutes, but they accomplish several things.

I'm able to put a name with a face very early in the semester. A short personal chat shows that I'm interested in them as more than a number, and establishes me as a nice guy (for awhile at least). The weaker students are more likely to seek out friendly help before they get behind. And it assures me that they know where my office is, allowing me to easily ignore excuses along those lines later in the semester.

I find that in this way I can learn all of my students' names in the first two weeks. Knowing names early in the semester, I'm able to hand homework back more efficiently and to avoid some of those awkward moments where I can't associate names and faces. But the best part of it is actually sitting down with happy enthusiastic young people who will be working hard to do well in my class. This is the part of teaching I love.

For each class, I copy the forms on colored paper, making it easy to differentiate between students in different classes. I ask students I already know to tell me something about them that I don't already know. For larger classes, one could take a quick digital picture of each student during the visit for an additional aid. Of course, you can think of ways to make this work best for you.

I like to try to get to know my students at some point anyway. This scheme makes this intentional, and getting them one-on-one early in the semester tends to pay off over time.

Time Spent: 3-5 minutes of non-class time per student at the beginning of the semester.

Time Saved: It cuts the time to hand homework back in half (versus not knowing names), perhaps 5 minutes per class; perhaps hours of tutoring students behind; and many awkward moments throughout the semester.

Chad Westphal teaches at Wabash College in Crawfordsville, IN.

FOCUS Deadlines

	November	December	January
Editorial Copy	September 16	October 16	November 16
Display Ads	September 21	October 26	November 22
Employment Ads	September 7	October 12	November 10

Teaching Time Savers are articles designed to share easy-to-implement activities for streamlining the day-to-day tasks of faculty members everywhere. If you would like to share your favorite time savers with the readers of FOCUS, then send a separate email description of each activity to Michael Orrison at orrison@hmc.edu. Make sure to include a comment on "time spent" and "time saved" for each activity, and to include pictures and/or figures if at all possible.

EMPLOYMENT OPPORTUNITIES

MARYLAND

Salisbury University
Salisbury University Department of Mathematics and Computer Science invites applications for a tenure-track Assistant Professor position starting 15 August 2008. A Ph.D. in mathematics or statistics is required. For complete position description and more information see: http://faculty.salisbury.edu/~mathcosc/. Screening begins on January 2. Salisbury University is a EEO Employer.

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